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| 10/721,235                         | 11/26/2003  | Raymond Kuzbyt       | 033915-002          | 5692             |
| 21839                              | 7590        | 12/30/2004           | EXAMINER            |                  |
| BURNS DOANE SWECKER & MATHIS L L P |             |                      | PERT, EVAN T        |                  |
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|                                    |             |                      | 2829                |                  |

DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/721,235

Applicant(s)

KUZBYT ET AL.

Examiner

Evan Pert

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-60 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-60 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0204, 0404</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. The examiner notes typographical informalities in the disclosure. For example, at [0002], the second sentence is incomplete; at [0003], "souces" should read --sources--; at [0024], "GaAr" should read --GaAs--. Applicant is requested to correct all informalities after a thorough review of the disclosure. Correction is required.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-60 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The terms "non-destructive light" and "quiescent substrate" in the independent claims are ambiguous terms even though applicant attempts to explain these terms in the disclosure. At [0020], applicant defines a "quiescent substrate" as a substrate "not in an excited state" to "any appreciable degree" when impinged with "non-destructive light."

Applicant indicates that prior art using a laser is "destructive," yet US 6,825,933 indicates that the use of the laser is "rather non-destructive" [col. 2, line 10]. This contradiction, that appears elsewhere in the prior art, combined with applicant's lack of *quantification* of "non-destructive" and "quiescent," renders the exact scope of the claims ambiguous.

For purposes of examination, a light is considered as being "non-destructive" if a reference uses the word "non-destructive" to describe the measurement technique, and a substrate is a "quiescent substrate" if the substrate is being illuminated by light for making "reflectivity" or "reflectance" measurements only, rather than for measuring parameters that require *excessive* "excitation," such as measurements of a "thermal wave."

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 9, 11-12, 15-16, 24, 26-27, 30, 45-50, 55 and 60 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Roberts et al. (US 6,825,933 B2), with interpretations in accordance with the rejection under 35 USC 112 above:

Claims 1, 15, 16, 30, 45-46, 49-50, 55 and 60

Regarding claims 1, 15, 16, 30, 45-46, 49-50, 55 and 60, a map of reflectivity changes corresponding to ion implantation dosage is generated [e.g. Fig. 3B], using light source 701.

The light source 701, being part of a "spectrometer," is "non-destructive" [col. 4, lines 21-26], and so falls within the scope of applicant's claim term "non-destructive" and as being illuminated on a "quiescent substrate," in view of the interpretation set forth in the rejection under 35 USC 112 set forth above.

Particularly, since only optical reflectance measurements are made (e.g. not thermal wave measurements), the spectrometer's light does not "excite" the wafer (200) to "any appreciable degree" [0020], so the wafer 200 is a "quiescent substrate" when being illuminated by the spectrometer's light source 701.

Regarding claims 55 and 60, the "PLAD" method of implanting in the preamble is not considered as having significant patentable weight on a generalized method of measuring implant dosage [MPEP 2111.02].

Claims 11-12, 26-27, 47-48

A "wafer with features" is considered to include a "wafer" with "thin oxide film" (features) on its surface.

Claims 9 and 24

The pattern in Fig. 2B is considered as being "a set of concentrically spaced circles spaced 1 mm apart."

Broader claims 45, 47-50, 53 and 54 anticipated by less related art

5. Claims 45, 47-50, 53 and 54 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Ledger (US 5,333,049), wherein a "map" [e.g. col. 2, lines 42-47] is generated using non-destructive monochromatic and polychromatic light reflected from a substrate for determining (i.e. characterizing) film thickness on the wafer. Since only reflectance data is gathered, the non-destructive light in the apparatus of Ledger leaves the wafer as a "quiescent substrate" (i.e. the "substrate is not excited to any appreciable degree").

***Claim Rejections - 35 USC § 103***

Claims 8 and 23

6. Claims 8 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 6,825,933) as applied to claims 1 and 16 above, and further in view of Blake et al. (US 5,811,823).

Roberts et al. is silent about measuring ion implantation dose specifically "in a flat panel display."

Blake et al. (US 5,811,823) discloses an apparatus for accurate ion implantation in a "flat panel display."

It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to use the invention of Roberts et al. to check the dosage control in the apparatus of Blake et al..

One of ordinary skill in the art would be motivated to adopt the measurement of ion dose in Roberts et al. because the invention provides ion implantation dosage measurements that are "high resolution, repeatable, efficient and accurate" [abstract]. In Blake et al., the apparatus efficiently produces "large quantities of flat panel displays," and has a dosage measurement section, so one of ordinary skill would be motivated by the benefits of the invention of Roberts et al. to double-check the measurement and control of dosage in Blake et al. [see MPEP 2144].

Claims 2, 3, 17, 18, 51, 52, 56 and 57

7. Claims 2, 3, 17, 18, 51, 52, 56 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 6,825,933 B2) as applied to claims 1, 16, 45 and 55 above, and further in view of Official Notice.

Roberts et al. is silent about the number of measurement points being "37,700," or "87,700," and/or that the wafer diameter is "20 cm" or "30 cm," as claimed.

Roberts et al. do state: "the more wafer measurement points taken, the more accurate the results are" [col. 7, lines 24-25].

It would have been obvious to one of ordinary skill in the art to take many measurements, to average out noise as is disclosed by Roberts et al..

One of ordinary skill would be motivated to work with standard wafer sizes (such as 20 and 30 cm wafer diameters), and would be motivated to get the most "accurate results" with greater numbers of measurements

Furthermore, the examiner takes Official Notice that the courts have held that changing an amount or size in the prior art is not patentable unless there is some kind of unexpected result [see MPEP 2144].

Since claims 2, 3, 17, 18, 51, 52, 56 and 57 merely recite specific numbers of measurements and/or specifically sized wafers that are standard sizes, in addition to clearly anticipated limitations of the independent claims, these claims are also not patentable, because one of ordinary skill would have been motivated to select standard wafer sizes and perform any arbitrarily large quantity of measurements to obtain more "accurate results" per Roberts et al. [see MPEP 2144], the specific numbers of "37,700" and "87,700" and/or wafer sizes of "20 cm" or "30 cm," rendering nothing unexpected.

Claims 4-7 and 19-22

8. Claims 4-7 and 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 6,825,933 B2) as applied to claims 1, 16, and 55 above, and further in view of Official Notice.

Roberts et al. indicate that 75 reflectance measurements would take on the order of 2.5 to 3 minutes, but is silent about scanning more points at a faster speed, such as thousands of points in less than 5 minutes as claimed.

The examiner takes Official Notice that faster measurements are beneficial because faster measurements save time. The examiner also notes that applicant's written description is missing critical elements that render the *time it takes to scan* points as being significant, such elements being a particular processor speed, etc..



It would have been obvious to perform an arbitrarily large number of measurements, in as fast a time as possible, in order to save time, such as in about 3 minutes or in about 5 minutes, and in order to improve accuracy (wherein more measurements results is greater accuracy) [see MPEP 2144].

Claims 31-39 and 41-42

9. Claims 31-39 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 6,825,933 B2).

Regarding claim 31, the limitations of lines 1-8 and 11-20 are clearly anticipated by the apparatus depicted in Fig. 7 of Roberts et al., yet Roberts et al. is silent about "a stage" with functionality claimed at lines 9-10 as being "for moving the substrate and the illumination area in first and second scanning patterns."

The examiner takes Official Notice that a "stage" with x and y movement for positioning a wafer being processed or measured was well known to any of rudimentary skill in the art at the time of filing. In fact, a movable stage is so common that Roberts et al. depict the wafer 200 floating in air, when the wafer clearly can't be "floating in air." Furthermore, an x-y movable stage (i.e. a stage with first and second scanning directions) is desirable in Fig. 7 of Roberts et al. to get a two-dimensional (e.g. x-y) mapping of the entire wafer as depicted in Fig. 3B.

Alternatively, if a movable stage were not adopted for the wafer 200 in Fig. 7 of Roberts et al., the light signal for reflectance measurements for determining ion dosage would have to be deflected by movable optical elements 703 and 705, but Roberts et al. does not indicate movability of 703 and 705.

It would have been obvious to one of ordinary skill in the art to add a notoriously well known stage for moving the wafer in x-y scanning directions in the apparatus of Fig. 7 of Roberts et al., motivated to move the illumination reflection area all over the wafer to create an x-y mapping of the entire wafer as depicted in Fig. 3B of Roberts et al. [see MPEP 2144].

Regarding claims 32 and 33, the exact number of measurements being "37,700" or "87,700" for "200 mm" and "300 mm" standard wafer sizes does not render the claims patentable over Roberts et al. for the same reasons explained for claims 2, 3, 17, 18, 51, 52, 56 and 57, discussed under item 7 above.

Regarding claims 34-37, the time it takes to scan in Roberts et al. is slower than as claimed by applicant. However, in view of applicant's lack of written description of something inventive or unexpected about a faster scanning time, and in view of the reasons indicated in the rejection of claims 4-7 and 19-22 under item 8 above, claims 34-37 are not rendered patentable over Roberts et al. by claims of greater scanning speed with a greater number of measurements.

Regarding claim 38, Roberts et al. is silent about how to scan the wafer 200 in the apparatus of Fig. 7, and instead relies on common knowledge of the ordinary skill in the art. The examiner takes Official Notice that a scan of a wafer using a notoriously well known movable stage, involves a linear scan in at least two directions in order to obtain a two-dimensional map of the entire wafer surface, such as depicted in Fig. 3B of Roberts et al..

It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to adopt a movable x-y stage in the apparatus depicted in Fig. 7 of Roberts et al., motivated to get the ability to have first and second scanning directions that allow one to generate a two-dimensional map of the wafer 200 as depicted in Fig. 3B of Roberts et al..

Regarding claim 39, the scanning pattern in Fig. 2B of Roberts et al. is considered as comprising "a set of concentric circles spaced by a radial distance of about 1mm."

Regarding claims 41 and 42, the invention of Roberts et al. is applicable to a featureless wafer and a wafer having thin oxide surface features.

Claims 10, 13-14, 25, 28-29, 40, 43-44, 53, 54, 58 and 59

10. Claims 10, 13-14, 25, 28-29, 40, 43-44, 53, 54, 58, 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 6,825,933 B2) as applied to claims 1, 16, 31, 45 and 55 above, and further in view of Malinen (US 6,075,595).

Roberts et al. is silent about the light source (701) comprising an "LED" or being "incoherent" (i.e. non-coherent) and "polychromatic" (i.e. emitting over more than one wavelength) as useful for making the reflectivity measurements for mapping ion implantation profiles. Yet, Roberts et al. does indicate that any apparatus capable of measuring reflectance at different wavelengths is suitable, such as a "spectrometer" disclosed in US 5,880,831 [col. 9].

Malinen discloses an "LED spectrometer" wherein the LEDs are implicitly polychromatic and incoherent light sources (e.g. like incandescent lamp per col. 2). These LEDs are usable for obtaining reflectivity measurements over a range of wavelengths in the for of an "LED spectrometer," wherein the "LED" is an "efficient" light source [abstract of Malinen].

It would have been obvious to one of ordinary skill in the art at the time of the claimed invention to adopt an LED light source (which is polychromatic and incoherent) as the light source 701 in Roberts et al., motivated to use an "efficient" light source for a spectrometer required in Roberts et al..

### ***Conclusion***

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 571-272-2034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2829

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP  
December 22, 2004



**EVAN PERT**  
**PRIMARY EXAMINER**